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Project Full Name: Science and Society: From a History of the “Emotional Images of DNA” to a Set of Multidisciplinary Actions for Disseminating Good Social Values in Europe

Marie Curie Actions
IEF - Final Report

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1. FINAL PUBLISHABLE SUMMARY REPORT

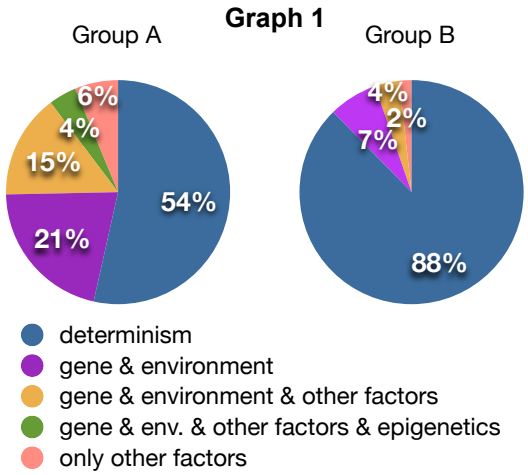
This research has set a series of objectives linked to the *collective imagination* that revolves around DNA and its possible influences upon human qualities (ethics, intelligence, social attitudes, etc). In particular we have been interested in examining the spectrum of ideas in Europe regarding the DNA/HUMAN QUALITIES relationship. Each DNA idea-image[1] rests upon a heterogeneous possible series of information and sources. Therefore, we aimed to analyse the channels that contributed and contribute the most to the formation of DNA ideas-images present throughout society. We especially wanted to understand if the collective idea of DNA currently diffused in society is prevalently a fruit of: a. direct scientific information; b. narrative engines of a different kind. Finally, we set the objective to understand if it is possible to retrace the historical, philosophical, psychological, and social roots within the DNA ideas-images of society, and which actions can be carried out to spread an idea of DNA that is more exact and useful for integration in Europe.

The work carried out to achieve the objectives of the project was mainly focussed on the analysis of two sources: 1. The scientific literature concerning the discoveries in the genetic field of the last sixty years; 2. The newspaper press. The data that came out from this comparative research was subsequently subjected to critical interdisciplinary analysis which was possible within a large academic institution like the EHESS of Paris – the institution that accepted the research project during its development. Four papers were taken into consideration (*Le Monde, New York Times, The Times, Sunday Times*), in three time windows: the first six months of 1990, the first six months of 2000, and the first six months of 2010. About 900 articles were examined, divided into two groups: A. "science and culture"; B. "customs and society".

The research started with the conviction that the concept of DNA enjoys a strong component of determinism, and that vital processes (and in particular those linked to human behaviour) are seen under a widespread gene-centric and reductionist conviction (everything depends on genes) following the great enthusiasm that the discovery of DNA transmitted in the past century within the scientific community and in society. Our research carried oud a more complex scenario. In fact, it was seen that groups A and B show significant heterogeneity. The articles on scientific matters (A), like book reviews or dossiers on new discoveries, show that an array of varied positions accommode the role of the gene with various additional factors (environment, chance, learning, epigenetic). (graph 1). The most interesting data comes from the performance of the determinist positions over time. If we consider group A, determinism decreased from 2000 to 2010, passing from 73% to 49%. However, if we consider group B, (customs and society) the performance is quite the opposite and we can see an increase in the number of articles that contain ideas that are in some way determinist and gene-centric, from 62% in 2000 to 82% in 2010 (graph 2).

Apart from the quantitative data – that is relatively interesting in the area of research like this one – a *qualitative* analysis of the material has enabled us to trace some interpretative lines on the collective imagination around DNA that are synthetically mentioned as follows:

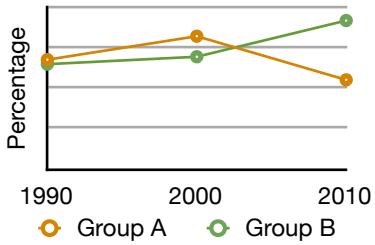
Graph 1



a. The errors of a gene-centric vision. The twentieth century was the *century of the gene.* The discovery of DNA and the mechanism of the transmission of genetic information has shifted the vast set of variables that over the eighteenth and nineteenth centuries had accompanied the study of life (development, environment etc.) towards an ever greater attention to the gene seen as a single creator of vital processes. So, at least in certain cases we have fallen into a double misunderstanding: 1. The conviction that the gene determines each characteristic in a predictable way; 2. The

[1] In this context, the term "image of" (for example, image of DNA, image of science, image of nature) does not refer to an image in the sense of a painting, synopsis, photograph, or other graphic rendering. Rather, it coincides with the *representation* that one or more subjects have of a given concept.

Graph 2
Determinist positions over time



conviction that also brain performances, like numerous somatic traits (skin colour, body structure etc), are to a certain extent a product of the genes. A series of studies has derived from this – also very recently – aimed at finding the genetic origins of human behaviour. In 2010 the magazine *Intelligence* published an article by Richard Lynn (University of Ulster, UK) in which he claimed that the Arab colonization of southern Italy in 1000 A.D. was the cause of genetic corruption that led the people of this area of the Mediterranean to have a low IQ, with the consequent scant economic development of the region.

b. Genetics/the Brain: a complex machine. The recent discoveries in genetics have thrown the gene-centric concept of past years into disarray. The regulation effects show that they have a key role. The recent break-throughs in the field of neural plasticity support an ontogenetic role (development, culture, reorganization) according to the rule that *the brain builds itself*. The relationship between genetics and the nervous system is indirect and shows sample levels of freedom. The key word is *rewiring*.

c. The deceptive imagination. This new scientific view is not very widespread in the collective imagination. Expressions such like "the fashion gene", or "art is present in his genetic code" are common both in the press and in everyday language. From this we can gather that a *paradigm shift* in the collective way of thinking has not taken place: everyone knows the metaphor of DNA as a programme, but few know its limits to our cognitive and moral performance.

d. Causes and roots of the deceptive imagination. Among the many elements that intervene in the persistence of the reductionist imagination, two appear to be crucial: 1. The efficiency of the metaphor as software or a book: it is simple, easily visible and therefore well widespread. However, the complexity of DNA has not yet identified a metaphorical icon that is able to give rise to a collective imagination; 2. To this we can add the fact that genetic determinism falls within a collective need that precedes the discovery of DNA: the need for order and control over nature that man has developed since the era of myths and during the entire course of the history of ideas. Some examples are: the myths of Joseph Campbell, the idea of Pythagorian harmony still present in Keplero and in naturalists like Lavater J. Kaspar; and the Cartesian mechanism that crossed naturalistic thought between the 1600s and 1700s.

e. The risk of biological prejudices on human qualities. On a social level this incorrect idea of DNA gives space to *new (often unaware) forms of racism*. The gravity of *such biological prejudices on human qualities* lies in the fact they can be spread also among tolerant, democratic people. The idea is not that one race is more gifted than another. More simply, in the collective way of thinking, we believe that "an aggressive or less intelligent individual" could owe this unfortunate situation to a hereditary genetic cause in the family. These are reflections of a *determinist idea* borrowed from the collective imagination. The reasons for such prejudices are not therefore ideological or political and are independent of race.

In conclusion, the data shows the urgent need to carry out actions that enable the situation identified by the research to have a potential positive impact in society. Given its distance from a strictly scientific scenario, it is clear that the collective imagination around DNA is mainly constructed around the reasons set out in points b, c and d – in particular from an inefficient spread of new scientific knowledge. In this sense, the actions carried out (see *Dissemination*) for the planning of cultural objects able to comunicate the new image of DNA using metaphorical narrative tools, that involve the public both on a rational level and on an emotional one are promising.[2] The data that emerged from this research confirms that policy makers should increase the support for new means of communication as in part hoped for in the European directives concerning *science in society*.

[2] See also Coco E., *Divulgation and communication of science*, Coniglione F. (Ed.), *Through the Mirrors of Science. New Challenges for Knowledge-based Societies*, Ontos Verlag, 2010, pp. 77-87; Coco E., Dialogues, *Notes, Essays, Letters and Diaries. An Analytical Proposal Regarding the Contribution of Literature to the Society of Knowledge*, «Axiomathes» , vol. 19, 2009, p. 401-415.